

REMARKS

This Amendment and Response to Non-Final Office Action is being submitted in response to the non-final Office Action mailed May 17, 2005. Claims 1-35 are pending in the Application. Claim 28 stands rejected under 35 U.S.C. 102(e) as being anticipated by Cardwell et al. (U.S. Patent Application Publication No. 2002/0036988). Claims 29-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Ramamurthy et al. ("Optimizing Amplifier Placements in a Multiwavelength Optical LAN/MAN: The Unequally Powered Wavelengths Case," IEEE/ACM Transactions on Networking, Vol. 6, No. 6, December 1998, pp. 755-767). Claims 1-3, 7-10, 14, 32, and 34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. (U.S. Patent No. 6,304,347). Claim 33 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claim 32, and further in view of Sharma et al. (U.S. Patent No. 6,046,833). Claims 4-6, 11-13, and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claims 1, 8, and 32, and further in view of Ramamurthy et al. Finally, Claims 15-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. and Ramamurthy et al.

In response to these rejections, Claims 1, 8, 15, 28, 29, and 32 have been amended to further clarify the subject matter which Applicant regards as the invention, without prejudice or disclaimer to continued examination on the merits. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments, reconsideration of the Application is respectfully requested in view of the following remarks.

**Rejection of Claim 28 Under 35 U.S.C. 102(e) – Cardwell et al.:**

Claim 28 stands rejected under 35 U.S.C. 102(e) as being anticipated by Cardwell et al. (U.S. Patent Application Publication No. 2002/0036988). Specifically, Examiner states:

Regarding Claim 28, Cardwell et al. disclose a network design tool for a wavelength division multiplexed optical network in which each optical node is capable of receiving a plurality of optical amplifiers (page 5, paragraphs [0055]-[0058]; page 7, paragraphs [0075]-[0076]), comprising:

selection means for placing at least one optical amplifier to form an initial placement in accord with an optical power criteria (page 5, paragraphs [0056]-[0058]);

means for forming a set of optical amplifier placement configurations in accord with the initial placement of the selections means (Figure 5; page 3, paragraph [0026]; page 6, paragraphs [0065] and [0068]; page 7, paragraphs [0071]-[0078]; page 8, paragraphs [0079]-[0082]); and

quality of service means to analyze the quality of service of each amplifier placement configuration (page 6, paragraph [0068]; page 7, paragraph [0076]).

Examiner notes that Cardwell et al. disclose “forming a set of amplifier placement configurations” by forming a set of possible ring networks, wherein each possible ring network includes amplifiers placed in accord with an optical power criteria (page 3, paragraph [0026]; page 7, paragraphs [0075]-[0076]).<sup>1</sup>

Applicant submits, however, that there are distinct and patentable differences between the systems and methods of the present invention and those of Cardwell et al. Cardwell et al. disclose systems and methods for designing ring structures in a telecommunications network by generating or selecting cycles of network nodes and links, choosing at which nodes to place what types of equipment, and assigning demand over that set of nodes, links and equipment. See page 5, paragraph [0054]. Cost comparisons are then performed. See page 6, paragraph [0064]. These processes are basically carried out by trial-and-error alone, with only simple design parameters and

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<sup>1</sup> Office Action, pp. 2-3.

constraints considered initially. See page 5, paragraphs [0056] and [0058]; page 6, paragraph [0061]. For example, these design parameters and constraints may include frame and installation, signal sources, regeneration loss thresholds, losses before amplification, maximum ring circumference, maximum and minimum numbers of add/drop multiplexers on a ring, fiber material, sheath installation, structure expansion, costs, etc. The processes are iterative and involve the consideration of demand between nodes alone, in order of the magnitude of demand. See page 6, paragraphs [0063] and [0064].

The present invention, on the other hand, discloses a more refined two-step approach in which an *initial* placement of optical amplifiers in an optical network is determined using an optical power criterion, subsequent placements consistent with this initial placement are then selected, and quality of service means are used to analyze the quality of service of each of these subsequent placements. This is made explicit in amended Claim 28, which recites:

28. A network design tool for a wavelength division multiplexed optical network in which each optical node is capable of receiving a plurality of optical amplifiers, comprising:

selection means for placing at least one optical amplifier to form an *initial* placement in accord with an optical power criteria;

means for forming a *subsequent* set of optical amplifier placement configurations in accord with the initial placement of the selections means; and

quality of service means to analyze the quality of service of each amplifier placement configuration.

Similar amendments have been made to Claims 1 and 8.

The optical power criterion used to determine the *initial* placement of optical amplifiers of these claims is also robust and novel, comprising one or more of a node loss algorithm wherein it is determined if a given node has an internal node loss for one or more channels that exceeds a predetermined level, a span loss algorithm wherein it is determined if a given span has an internal span loss for one or more channels that exceeds a predetermined level, an aggregate loss algorithm wherein it is determined if one or more nodes have an aggregate span and band loss for one or more channels that exceeds a predetermined level, and a sequential path search algorithm wherein the power characteristics of one or more channels are analyzed from add point to drop point. See amended Claims 15, 29, and 32.

The novelty and patentability of the systems and methods of the present invention are supported by their superior performance. By choosing an initial point using informed constraints and then iterating around this point, the time required to analyze a number of amplifier configurations is reduced from 697 years for an OC-48 analysis or 60,730 years for an OC-192 analysis of 10 nodes, representing approximately 1.1 trillion amplifier configurations, to a matter of hours, as the systems and methods of the present invention select and test only likely candidates. See Application, pages 26-27.

Therefore, Applicant submits that the rejection of Claim 28 under 35 U.S.C. 103 (a) as being anticipated by Cardwell et al. has now been traversed and respectfully requests that this rejection be withdrawn.

**Rejection of Claims 29-31 Under 35 U.S.C. 103(a) – Cardwell et al. and Ramamurthy et al.:**

Claims 29-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Ramamurthy et al. (“Optimizing Amplifier Placements in a Multiwavelength Optical LAN/MAN: The Unequally Powered Wavelengths Case,” IEEE/ACM Transactions on Networking, Vol. 6, No. 6, December 1998, pp. 755-767).

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 29-31 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Ramamurthy et al. has now been traversed and respectfully requests that this rejection be withdrawn.

**Rejection of Claims 1-3, 7-10, 14, 32, and 34 Under 35 U.S.C. 103(a) – Cardwell et al. and Beine et al.:**

Claims 1-3, 7-10, 14, 32, and 34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. (U.S. Patent No. 6,304,347).

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**Rejection of Claim 33 Under 35 U.S.C. 103(a) – Cardwell et al. and Sharma et al.:**

Claim 33 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claim 32, and further in view of Sharma et al. (U.S. Patent No. 6,046,833).

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claim 33 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claim 32, and further in view of Sharma et al., has now been traversed and respectfully requests that this rejection be withdrawn.

**Rejection of Claims 4-6, 11-13, and 35 Under 35 U.S.C. 103(a) – Cardwell et al., Beine et al., and Ramamurthy et al.:**

Claims 4-6, 11-13, and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claims 1, 8, and 32, and further in view of Ramamurthy et al.

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 4-6, 11-13, and 35 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claims 1, 8, and 32, and further in view of Ramamurthy et al., has now been traversed and respectfully requests that this rejection be withdrawn.

**Rejection of Claims 15-27 Under 35 U.S.C. 103(a) – Cardwell et al., Beine et al., and Ramamurthy et al.:**

Finally, Claims 15-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. and Ramamurthy et al.

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 15-27 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. and Ramamurthy et al. has now been traversed and respectfully requests that this rejection be withdrawn.

CONCLUSION

Applicant would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

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Christopher L. Bernard  
Registration No.: 48,234  
Attorney for Applicant

**DOUGHERTY, CLEMENTS, HOFER, BERNARD & WALKER**  
1901 Roxborough Road, Suite 300  
Charlotte, North Carolina 28211 USA  
Telephone: 704.366.6642  
Facsimile: 704.366.9744  
cbernard@worldpatents.com